SAGLE ELEMENTARY SCHOOL (PWSNO 1090117)
SOURCE WATER ASSESSMENT REPORT

August 5, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Sagle Elementary School*, describes the public drinking water well; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Sagle Elementary School drinking water is supplied by a single well drawing from a small aquifer in the vicinity of Sagle, Idaho. The water system is owned by Pend Oreille School District 84 and serves a population of 200 students. Historically, Sagle Elementary School has had few water quality problems. A ground water susceptibility analysis conducted by DEQ May 1, 2002 ranked the Sagle Elementary School well moderately susceptible to all classes of contaminants, mostly because of natural risk factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

The Sagle Elementary School water system already has some important drinking water protections in place. Operation and maintenance of the system is mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. The pump house is locked to prohibit unauthorized entry. A double check valve assembly on the irrigation system prevents back flows that could contaminate the potable water distribution system or the well during periods of low pressure.

Because the school district does not have direct jurisdiction over the entire recharge zone delineated for its well, it will be important to form partnerships with neighboring landowners, and local governmental agencies to protect ground water in the Sagle aquifer. As one of the key institutions in the community, the school is in a unique position to promote ground water stewardship. In addition to teaching school children, public education efforts can reach adults through programs sponsored by the parent association.

The district should develop a water system emergency response plan. It might also be helpful to have a written maintenance and testing schedule so important tasks don't get overlooked.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact the Coeur d'Alene Regional office of the Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR SAGLE ELEMENTARY SCHOOL

Section 1. Introduction - Basis for Assessment

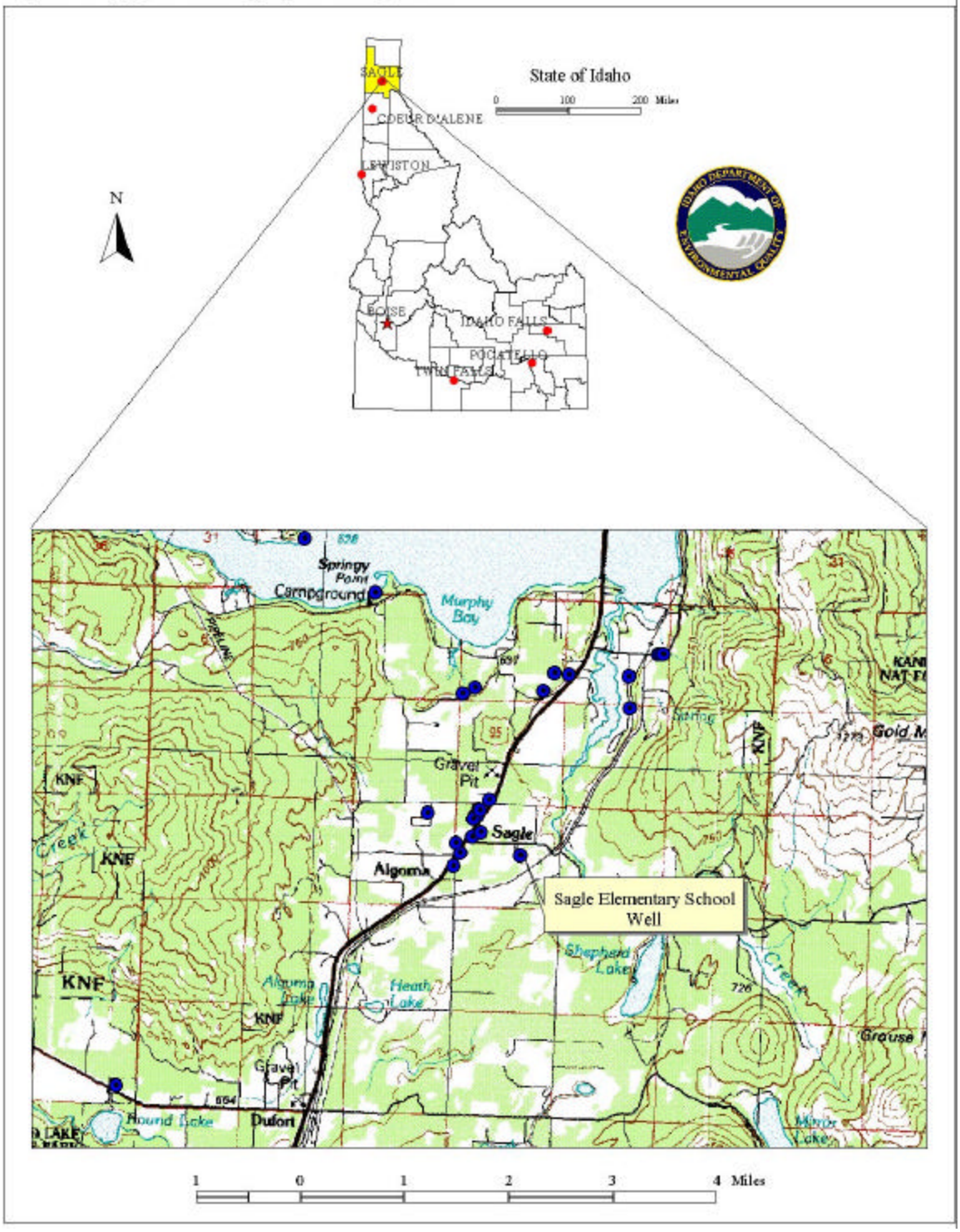
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Sagle Elementary School



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel zones indicating the number of years necessary for a particle of water to reach a well. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for the water public water systems pump from the Sagle aquifer. The computer model used data DEQ assimilated from a variety of sources including local well logs and the report *Steady State Simulation of Nutrient and Contaminant Transport in the Southside Aquifer Near Sagle, Idaho* prepared by J-U-B Engineers, Inc. for Southside Water and Sewer District.

The Sagle Elementary School water system serves a population of 200 students. The school is located on Sagle Road about 0.5 miles east of State Highway 95 (Figure 1). A single well pumping from the Sagle/Southside Aquifer supplies drinking water and water for irrigation. The well was deepened to 216 feet in 1995. The estimated capacity of the well is 7 gpm.

The well recharge zone delineated for the Sagle Elementary School Well covers 6.1 acres divided into 0-3, 3-6 and 6-10-year time of travel zones (Figure 2). The primary direction of ground water flow is from south to north.

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources inside individual source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. The maps and inventory lists were then sent to system operators for verification and correction in the second or enhanced part of the inventory process.

Figure 2, *Sagle Elementary School Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Sagle Elementary School well, the zone of contribution DEQ delineated for the well, and potential contaminant sites located in the vicinity. Land use inside the delineation boundaries is suburban residential.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

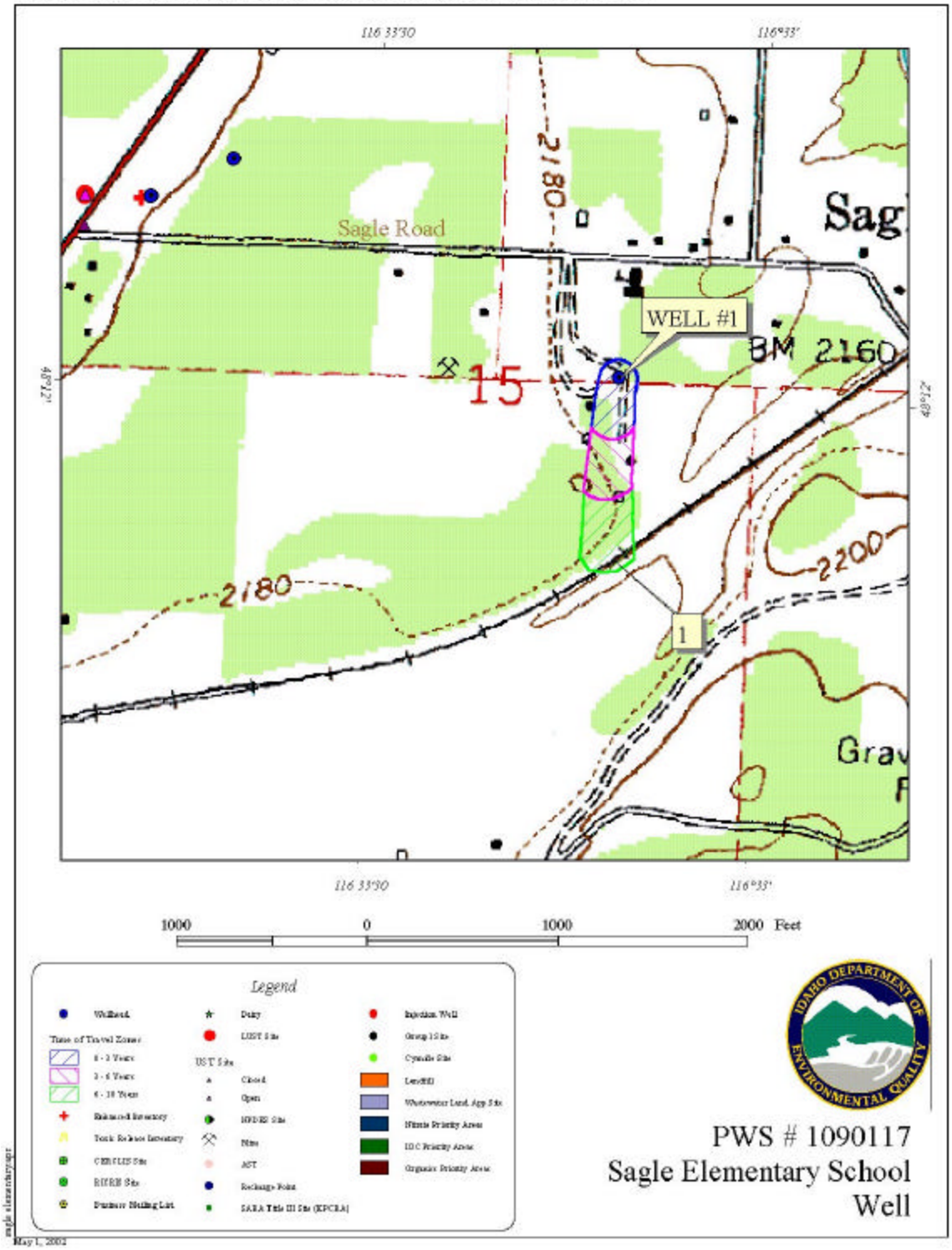
The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet in Attachment A shows in detail how the Sagle Elementary School well scored.

Well Construction

Construction methods directly affect the ability of a well to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The original well log for Sagle Elementary School is not available, but the driller's report for the well deepening is on file with DEQ. The last Sanitary Survey of the system was in April 2001. At the time of the survey the well cap gasket needed to be replaced. The work was to have been completed by October 15, 2001.

When the well was deepened in 1995 to 216 feet, a 6-inch casing was inserted into the existing 8-inch pipe and the space between was filled with dry bentonite clay to a depth of 200 feet. The new casing extends from 18 inches above ground to 200 feet below. A stainless steel well screen was set between 199 feet and the bottom of the well. The static water level is 10 feet below ground. Because the original well log is unavailable, the depth of the surface seal around the 8-inch casing, and soil characteristics at the well site are not known.

Figure 2. Sagle Elementary School Delineation and Potential Contaminant Inventory.



Hydrologic Sensitivity

The hydrologic sensitivity score for the Sagle Elementary School well is 6 points out of 6 points possible. This score reflects natural geologic conditions in the recharge zone as a whole and at the well site. Information for this part of the analysis is derived from the soil classification inside the delineation boundaries and from the soil profile reported on the well log. Soils in the capture zones delineated for the Sagle Elementary School well are generally moderately well drained to well drained. Poorly drained to moderately well drained soils are deemed more protective of ground water than soils which drain faster.

Because the original well log is not available, specifics about the soil composition above the water table at the well site are not known. It should be noted however that hydrologic sensitivity scores assigned to the Sagle Elementary School well are in line with scores for other wells in the vicinity.

Potential Contaminant Sources and Land Use

Land use inside the Sagle Elementary School well recharge zone is suburban residential. The nearest house is about 250 feet south of the well. Storm drains and septic system components for the school are all about 200 feet north of the well and are outside of the delineated well recharge zone. An abandoned spring near the well was sealed in 1996. The only potential contaminant source documented inside the delineation is the rail line crossing the 6-10-year time of travel zone.

Table 1. Sagle Elementary School Potential Contaminant Inventory

Map ID	SITE DESCRIPTION	POTENTIAL CONTAMINANTS[1]	TIME OF TRAVEL ZONE	SOURCE OF INFORMATION
1	Rail Line	IOC, SOC, VOC, Microbial	6-10 year	Geological Survey Maps

[1] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Historic Water Quality

Historically, Sagle Elementary School has had few water quality problems. In the period from December 1992 through December 2001 all of the quarterly water samples were negative for coliform bacteria. The school chlorinates its water prior to distribution. Chemical test results for Sagle Elementary School are summarized on the table below. The Bromodichloromethane, Chlorodibromomethane, Chloroform and Total Trihalomethanes detected in March 2002 are disinfection by products and are not indicative of volatile organic chemical contamination of the ground water.

Table 2. Sagle Elementary School Test Results

Primary IOC Contaminants (Mandatory Tests)							
Contaminant	MCL (mg/l)	Results (mg/l)	Dates	Contaminant	MCL (mg/l)	Results (mg/l)	Dates
Antimony	0.006	ND*	10/25/95-3/13//02	Nitrate	10	0.08 to ND	11/29/93 to 10/3/00
Arsenic	0.01	ND	10/25/95-3/13//02	Nickel	N/A	ND	10/25/95-3/13//02
Barium	2.0	0.02	3/13/02	Selenium	0.05	ND	10/25/95-3/13//02
Beryllium	0.004	ND	10/25/95-3/13//02	Sodium	N/A	12.0 to 14.56	10/24/95 to 3/13/02
Cadmium	0.005	ND	10/25/95-3/13//02	Thallium	0.002	ND	10/25/95-3/13//02
Chromium	0.1	ND	10/25/95-3/13//02	Cyanide	0.02	ND	10/25/95-3/13//02
Mercury	0.002	ND	10/25/95-3/13//02	Fluoride	4.0	0.4 0.6	2/18/98 3/13/02

Secondary and Other IOC Contaminants (Optional Tests)			
Contaminant	Recommended Maximum (mg/l)	Results (mg/l)	Dates
Sulfate		15.4 to 16.1	10/24/95 to 3/13/02

Regulated and Unregulated Synthetic Organic Chemicals		
Contaminant	Results	Dates
29 Regulated and 13 Unregulated Synthetic Organic Compounds	None Detected	10/19/93, 12/2/98

Regulated and Unregulated Volatile Organic Chemicals		
Contaminant	Results	Dates
21 Regulated And 16 Unregulated Volatile Organic Compounds	None Detected except as noted below	8/3/93, 12/2/98
Bromodichloromethane	1.0 µg/l	3/13/02
Chlorodibromomethane	0.9 µg/l	3/13/02
Chloroform	1.2 µg/l	3/13/02
Total Trihalomethanes (TTHM)	3.1 µg/l	3/13/02

*ND = None Detected

Final Susceptibility Ranking

The Sagle Elementary School well ranked moderately susceptible to all classes of regulated contaminants. Risk factors associated with local geology added the most points to the final susceptibility scores. Final scores and ranking relative to each class of contaminant are summarized on Table 3. The complete analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 3. Summary of Sagle Elementary School Susceptibility Evaluation

Final Susceptibility Scores/ Ranking				
	IOC	VOC	SOC	Microbial
Well	10/Moderate	10/Moderate	10/Moderate	9/Moderate

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
HIGH* - Indicates source automatically scored as high susceptibility due to presence of bacteria or a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

The Sagle Elementary School water system already has some important drinking water protections in place. Operation and maintenance of the system is mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. The pump house is locked to prohibit unauthorized entry. A double check valve assembly on the irrigation system prevents back flows that could contaminate the potable water distribution system or the well during periods of low pressure.

The school's property line runs only 16 feet south of the well, so a portion of the sanitary setback zone and most of the delineated well recharge zone are outside of the school district's ownership. Partnerships with neighboring landowners should be established. Some of them may not be aware that their property is in a sensitive area where household, agricultural or business practices could have a negative impact on water quality for the school.

The area around the well is partially fenced. The district may want to cover the wellhead and completely enclose the area around it for security reasons and to control activities that could inadvertently cause contamination. Additional guidelines for protecting public drinking water systems through increased security measures are available on the DEQ website, www2.state.id.us/deq/water/water1.htm.

The system should develop a drinking water emergency response plan. There is a simple fill-in-the-blanks form available on the website mentioned above to guide systems through the emergency planning process. It might also be helpful to have a written maintenance and testing schedule so important routine tasks don't get overlooked.

The school should also take advantage of the opportunity it has to teach its pupils about ground water stewardship. During Water Awareness Week each May, for example, several local agencies prepare demonstrations and hands-on activities for schools in the area. Other program ideas and materials are readily obtainable on the Internet. There are numerous programs designed for adults as well that might be appealing family projects the parent association could promote in conjunction with school projects for the children. Home*A*Syst and Farm*A*Syst for example are voluntary programs that help people assess environmental risks on their property and find technical support for making needed changes.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.deqstate.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Division of Environmental Quality, 1994. Ground Water and Soils Reconnaissance of the Lower Payette Area, Payette County, Idaho. Ground Water Quality Technical Report No. 5. Idaho Division of Environmental Quality. December 1994.

Idaho Division of Environmental Quality, 1996. Lower Payette River Agriculture Irrigation Water Return Study and Ground Water Evaluation, Payette County, Idaho. Water Quality Status Report No. 115.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

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Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Sagle Elementary School Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **SAGLE ELEMENTARY SCHOOL** Source: **WELL #1**

Public Water System Number : **1090117** 5/1/02 2:35:52 PM

1. System Construction		SCORE			
Drill Date	Well deepened in 1995				
Driller Log Available	YES for deepening				
Sanitary Survey (if yes, indicate date of last survey)	YES 2001				
Well meets IDWR construction standards	UNKNOWN	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	UNKNOWN	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		**3**			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	UNKNOWN	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	UNKNOWN	2			
Total Hydrologic Score		**6**			
		IOC	VOC	SOC	Microbial
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		Score	Score	Score	Score
Land Use Zone 1A	SUBURBAN RESIDENTIAL	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		**1**	**1**	**1**	**1**
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		**0**	**0**	**0**	**0**
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	YES RAIL LINE	1	1	1	
Sources of Class II or III leacheable contaminants or Microbials	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		**2**	**2**	**2**	**0**
Cumulative Potential Contaminant / Land Use Score		**3**	**3**	**3**	**1**
4. Final Susceptibility Source Score		**10**	**10**	**10**	**9**
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

BML (Business Mailing List)– This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

Closed Or Open UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.